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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/750,489	12/31/2003	Ki-Min Lee	20059/PIA31071	1804
34431	7590	10/28/2005	EXAMINER	
HANLEY, FLIGHT & ZIMMERMAN, LLC 20 N. WACKER DRIVE SUITE 4220 CHICAGO, IL 60606			LEE, CALVIN	
			ART UNIT	PAPER NUMBER
			2818	

DATE MAILED: 10/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/750,489

Applicant(s)

LEE, KI-MIN

Examiner

Lee, Calvin

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Amendment dated 10/12/05.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-7 and 9-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-7 and 9-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

OFFICE ACTION

Response to Amendment

1. The cancellation of claims 2 & 8 and the amendment of claims 1 & 7 dated October 12, 2005 are acknowledged.

Claim Rejections - 35 U.S.C. § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 (e) that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. Claims 1, 3, 5-7, 9-10, and 12-13 are rejected under 35 US.C 102(e) as being anticipated by *Rasmussen* (US 2004/0262658).

a) In re claims 1 and 7, *Rasmussen* discloses a method of fabricating an MIM capacitor of high capacitance in a semiconductor device, the method comprising the steps of:

-depositing an interlayer dielectric film 25 of PSG or TEOS on a metal line 50, 52 [¶ 0039]

-planarizing the interlayer dielectric film (see the flat top surface of the dielectric film in Fig. 9)

-etching the dielectric film to form a capacitor-forming region 41 [Fig. 10]

-sequentially depositing a lower electrode 71 [¶ 0042], an insulator layer 72 [¶ 0043], and an upper electrode 73 [¶ 0044] on the interlayer dielectric film;

-etching the lower electrode, the insulator layer, and the upper electrode to form the MIM capacitor [Fig. 11], wherein a capacitance of the MIM capacitor is determined by controlling a thickness of the interlayer dielectric film [¶ 0043].

b) In re claim 3, *Rasmussen* also suggests that the interlayer dielectric film is made of BPSG, PSG or TEOS [¶0039].

c) In re claims 5 and 12, *Rasmussen* suggests the insulator layer made of Ta₂O₅, Al₂O₃, Si₃N₄.

d) In re claims 6 and 13, *Rasmussen* suggests that the upper electrode is made of osmium, Pt, rhodium, Ru, palladium, or iridium [¶0044].

e) In re claims 9 and 10, *Rasmussen* suggests that the interlayer dielectric layer is planarized by CMP or dry etch (i.e., etch back) [¶ 0043].

Claim Rejections - 35 U.S.C. § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having skills in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 4, 11, and 14-15 are rejected under 35 U.S.C 103(a) as being unpatentable over *Rasmussen* in view of *Lopatin et al* (US 6,433,379).

a) In re claims 4 and 11, *Rasmussen* suggests the lower electrode made of Os, Pt, Rh, Ru, Pd or Ir, but not any one of Ti, W or TiN. *Lopatin et al* teaches a same method of fabricating an MIM capacitor of high capacitance, with a lower electrode **40** made of Ta, Ti, W, etc. [col. 4, ln.60].

It would have been obvious to one having skills in the art to combine the teachings of *Rasmussen* and *Lopatin et al*, and thus arrive at the claimed invention, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 SUPQ 416. Moreover, it appears as if any electrode material including the claimed materials would work equivalently to any other well-known electrode material as long as the preferable electrode material has a desired conductive characteristic.

b) In re claims 14-15, *Rasmussen* is silent about the lower electrode, the insulator layer and the upper electrode being planarized by CMP (or by an etch-back process). *Lopatin et al* suggests that the capacitor structure **10'** is planarized by CMP or etch back [Fig. 9 and col. 7].

It would have been obvious to one having skills in the art to have modified the process of *Rasmussen* by utilizing a CMP to planarize the capacitor structure for the purpose of forming a capacitor within its capacitor trench.

Response to Argument

6. After a closer review of the Applicant's argument (dated October 12, 2005) and after further search related arts (including the previous cited art, *Rasmussen*' 658) the examiner has realized that *Rasmussen* would read on at least claims 1 and 7 and the allowed feature (i.e., capacitance determined by controlling insulator thickness). Therefore, above is a new ground of rejections, which the Examiner relies on to reject the pending claims.

Contact Information

7. Any inquiry concerning this communication from the Examiner should be directed to *Calvin Lee* at (571) 272-1896 on Mondays thru Thursdays 6:30-4:30PM. If attempts to reach the examiner by telephone are unsuccessful, Art Unit 2818's Supervisory Patent Examiner *David Nelms* can be reached at (571) 272-1787. The fax phone number for the organization (where this application is assigned to) is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system at <http://pair-direct.uspto.gov>. Should you have questions on access to the PAIR system, contact the Electronic Business Center at (866) 217-9197.



Calvin Lee

Date: October 25, 2005